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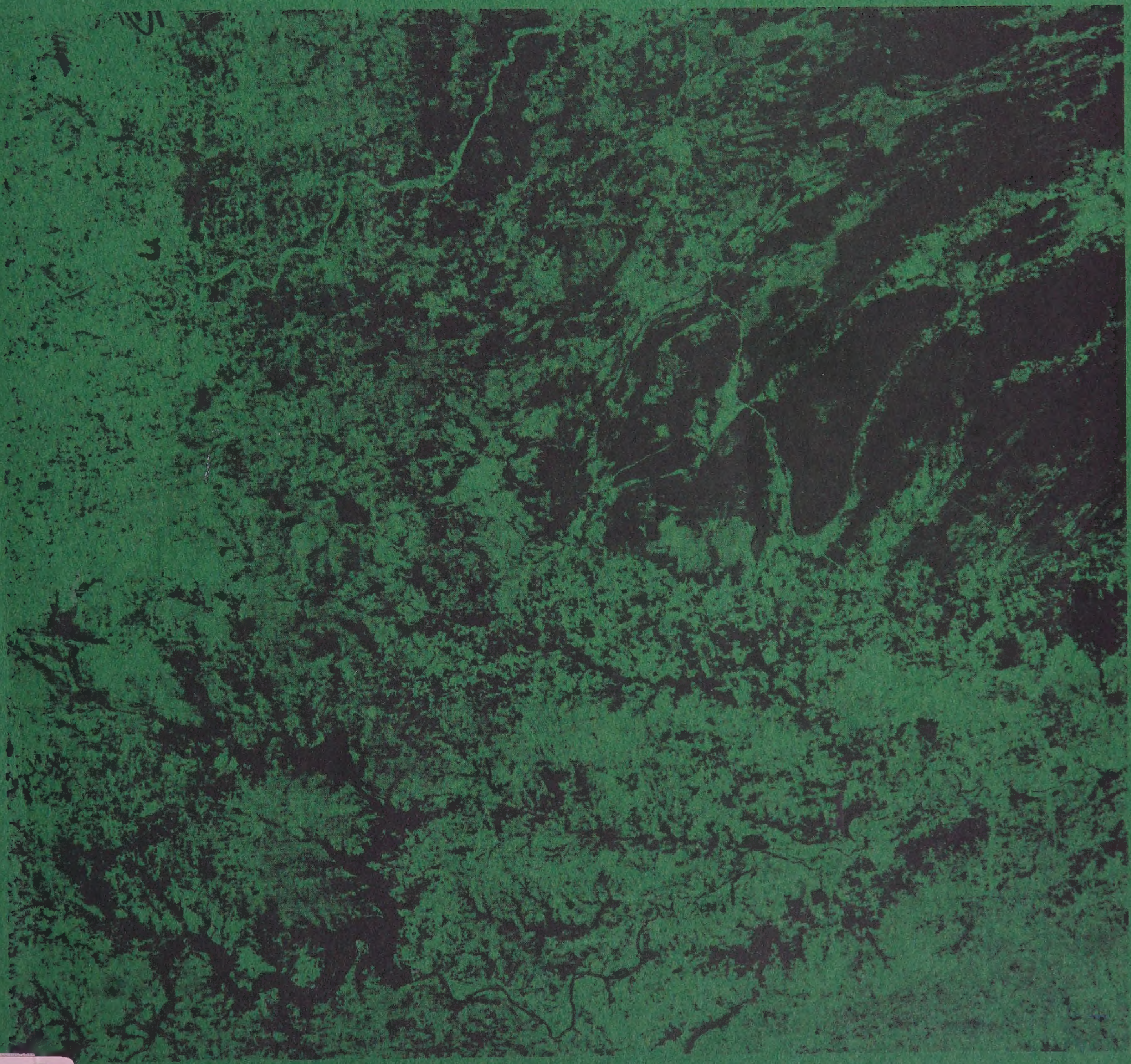

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DELINEATION OF PERMAFROST BOUNDARIES AND HYDROLOGIC RELATIONSHIPS

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We have analyzed the ERTS-1 MSS color composite of the Koyukuk-Kobuk River area, Alaska and RBV scenes of adjoining regions in the Brooks Range to the north (Figure XVIII-1). An interpretation team consisting of a geographer, a soil scientist, a geologist and a hydrologist studied tones, textures and patterns evident in the imagery. These were subsequently compared with existing maps and other data on surficial geology, vegetation, topography and permafrost. We believe that the tonal differences in the MSS color composite relate to vegetation density as well as species composition. Four density levels have been identified and mapped in this scene. They are:

- High density tones (very dark red) occurring along streams, resulting in a galaria forest type pattern.
- Medium density tones (dark red) on the upland areas are believed to be associated with the well developed white spruce forest. Recently burned areas within this unit appear as very high density black tones.
- Low density tones (reddish gray) occur in the extensive lowland areas. These areas are essentially treeless bogs and are punctuated by many thaw lakes typical of alluvial, poorly drained permafrost areas.
- Very low density tones (gray with very little red) probably indicative of old burn scars. In these areas shrubs are the dominant vegetation.

Eight surficial geology units have been recognized and mapped (Figure XVIII-2). They are:

b	Bedrock and colluvium deposits
Q_o	Outwash deposits
Q_{ag}	Undifferentiated alluvial, glaciofluvial deposits
Q_{fl}	Fluvial and Lacustrine deposits
Q_e	Eolian deposits
Q_u	Undifferentiated deposits
Q_f	Fluvial deposits
Q_{al}	Undifferentiated Alluvium-Lacustrine deposits

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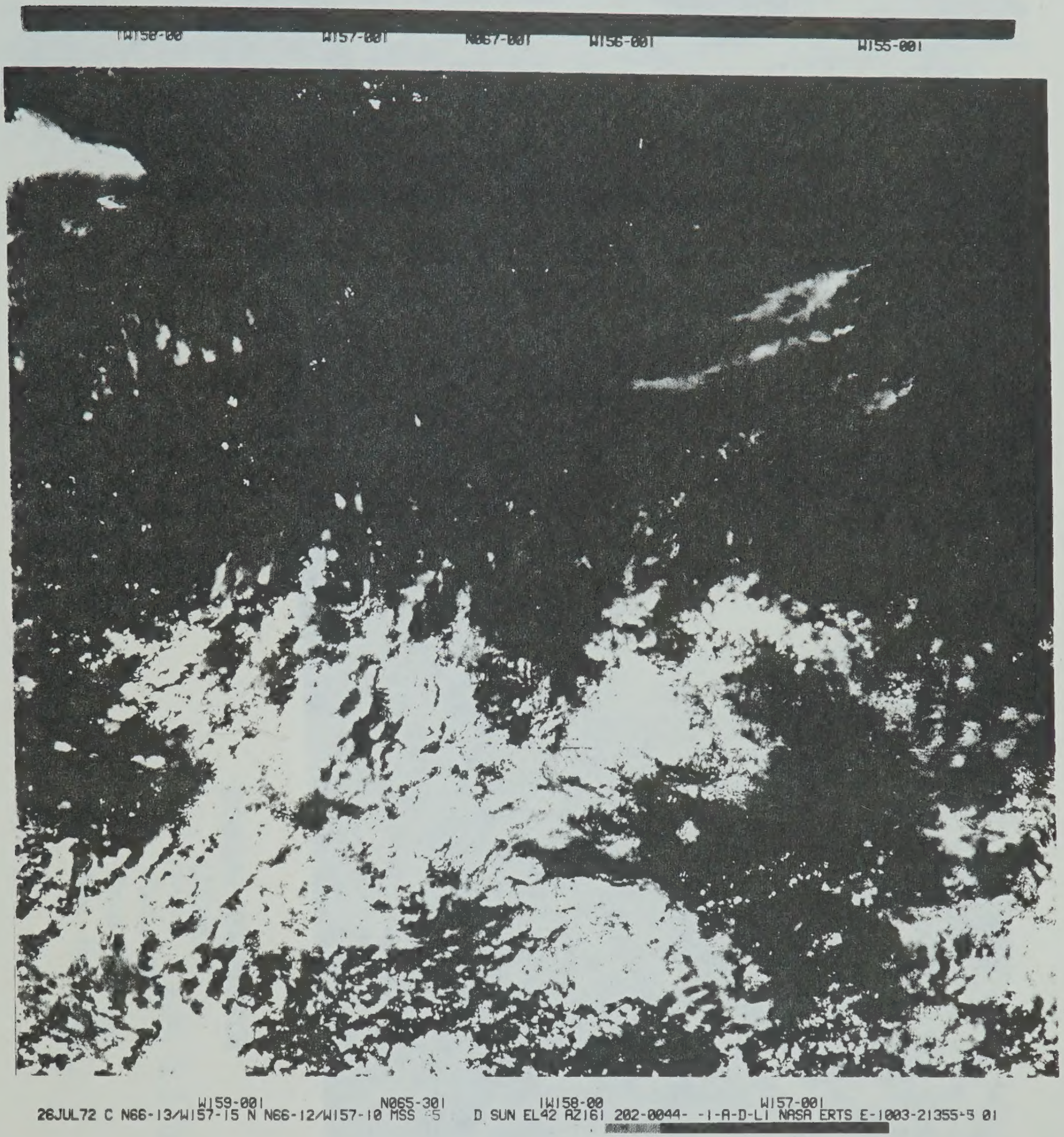
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Figure XVIII-1. MSS composite some 200 miles north of Fairbanks, Alaska in the Koyukuk River region. Smoke plumes from a forest fire are seen in the upper right portion of the photograph. The meander pattern of the Koyukuk River is visible in the upper left part of the photograph.

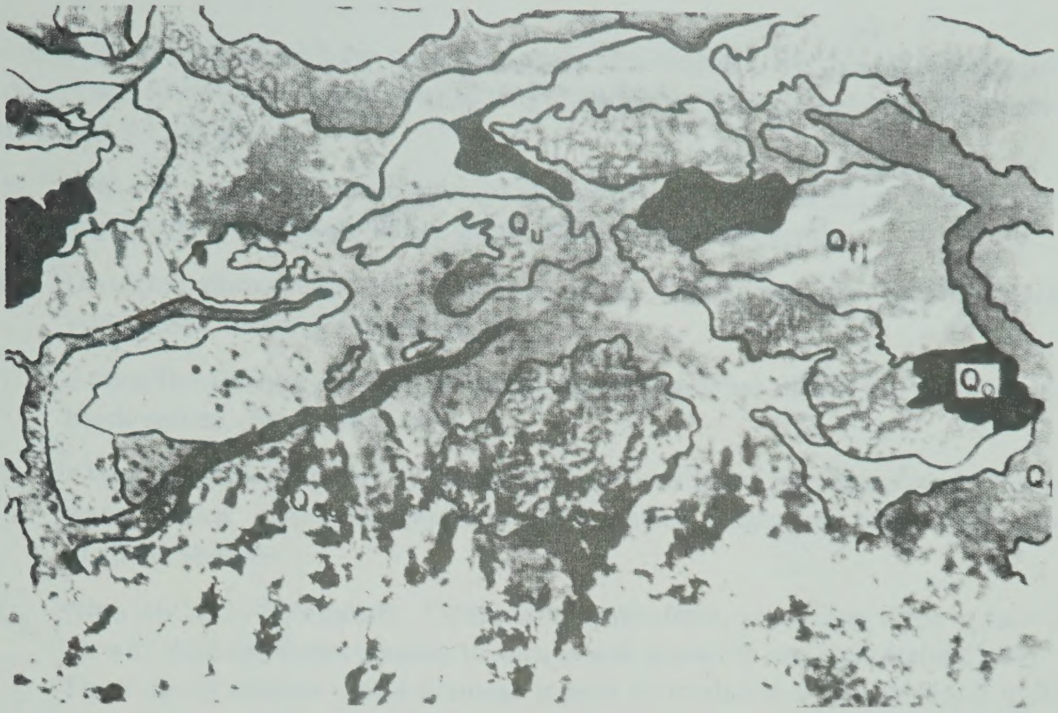

Figure XVIII-2. Enlargement of the upper portion of Figure XVIII-1. Mapped units represent the surficial geology units.

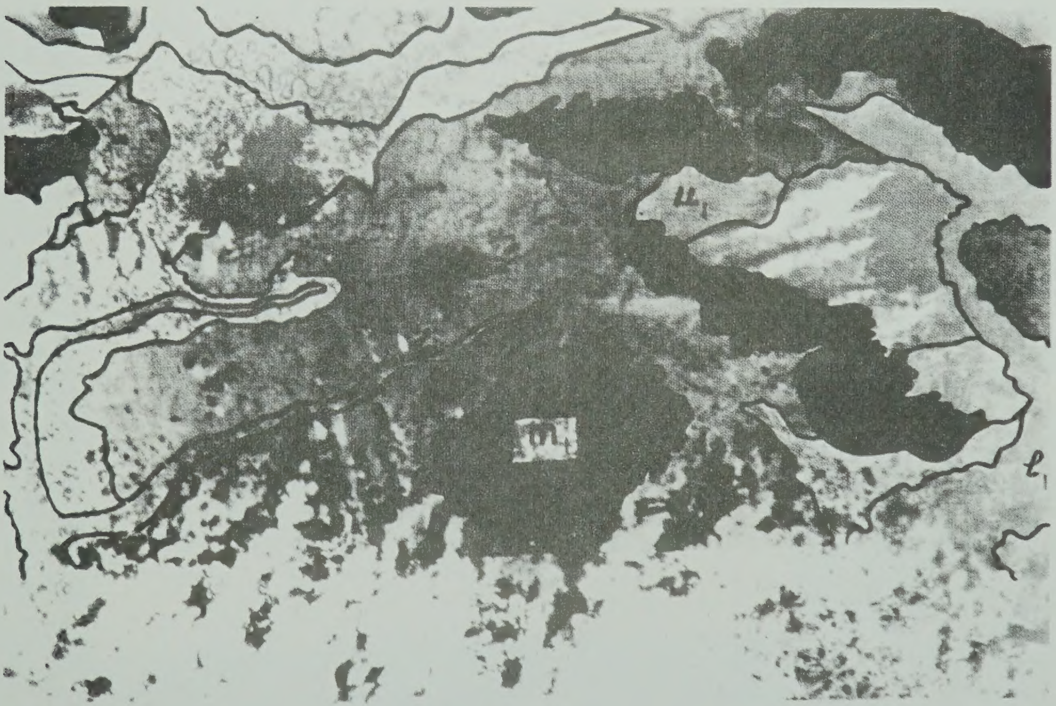

Figure XVIII-3. Enlargement of the upper portion of Figure XVIII-1. Mapped units represent permafrost categories.

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Five categories of permafrost have been recognized and mapped. In this preliminary interpretation it was found most convenient to employ geologic terms as category descriptors (Figure XVIII-3). They are:

M_1	Bedrock and colluvium scattered taliks; moderate seasonal thaw. Includes alpine vegetation grading into white spruce forest below timberline.
U_1	Dissected alluvial deposits. Numerous taliks. Solifluction probably active. Alpine vegetation. Thaw depth; moderate.
l_1	Active floodplains. Numerous taliks, vegetation dense shrubs interspersed with black spruce. Deep seasonal thaw.
l_2	Abandoned floodplains. Scattered taliks primarily in close association with large water bodies. Vegetation predominantly grasses, sedges, and small shrubs. Depth of thaw; shallow.
U_2	Alluvial-Colluvial deposits. Continuous permafrost, vegetation white spruce forest on well drained slopes grading to shrubs and grasses in less well drained sites. Thaw depth shallow where drainage is poor to moderate on south facing well drained slopes. Thaw depths: Shallow $<.5$m; Moderate .5-2m; Deep >2m.

The increase in size of an active burn area (Pah River fire) during the period July 8 to July 26 was determined by color densitometer planimetry to be 20,000 acres in 18 days.

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